

ART 34 AMDT
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We claim:

1. An ink jet printhead chip that comprises
a wafer substrate,
drive circuitry positioned on the wafer substrate, and
a plurality of nozzle arrangements positioned on the wafer substrate, each nozzle arrangement comprising
nozzle chamber walls and a roof wall positioned on the wafer substrate to define a nozzle chamber and an ink ejection port in the roof wall,
a micro-electromechanical actuator that is connected to the drive circuitry, the actuator including a movable member that is displaceable on receipt of a signal from the drive circuitry, the movable member defining a displacement surface that acts on ink in the nozzle chamber to eject the ink from the ink ejection port, wherein
the area of the displacement surface is between two and ten times the area of the ink ejection port.
2. An ink jet printhead chip as claimed in claim 1, in which the movable member of each actuator defines at least part of the nozzle chamber walls and roof wall so that movement of the movable member serves to reduce a volume of the nozzle chamber to eject the ink from the ink ejection port.
3. An ink jet printhead chip as claimed in claim 2, in which the movable member of each actuator defines the roof wall.
4. An ink jet printhead chip as claimed in claim 1, in which each actuator is thermal in the sense that it includes a heating circuit that is connected to the drive circuitry, the actuator being configured so that, upon heating, the actuator deflects with respect to the wafer substrate as a result of differential expansion, the deflection causing the necessary movement of the movable member to eject ink from the ink ejection port.
5. An ink jet printhead that includes a plurality of inkjet printhead chips as claimed in claim 1.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 23 MAR 2004

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Applicant's or agent's file reference MJ91-PCT	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU2002/001162	International Filing Date (day/month/year) 29 August 2002	Priority Date (day/month/year) 28 June 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ B41J 2/045, 2/05, B81B 7/02, 7/04		
Applicant SILVERBROOK RESEARCH PTY LTD et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 14 October 2003	Date of completion of the report 10 March 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer STEPHEN CLARK Telephone No. (02) 6283 2781

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/AU2002/001162

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed.
- ☒ the description, pages 1-21, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages 22, received on 2 March 2004 with the letter of 2 March 2004
- ☒ the drawings, pages 1-37, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/AU2002/001162

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-5	YES
	Claims	NO
Inventive step (IS)	Claims 1-5	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-5	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

1. JP 2000141656
2. US 6378989
3. US 6258284
4. WO 200178986
5. WO 200102181

Novelty (N), Inventive Step (IS) Claims 1-5

None of the citations alone, or in obvious combination, disclose all of the features of any of the claims.

In particular, the feature of the movable member of each actuator defining at least part of the nozzle chamber walls and the roof wall was not found. The roof wall specifically distinguishes these claims from the invention of the citations above. The citations disclose all the other features of claims 1 and 2.